PLATE I

THE PASSING OF THE PHANTOMS

A Study of Evolutionary Psychology and Morals

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With four illustrations

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PREFACE

In this little book the author recounts, first hand, a number of instances—out of many more known to him—illustrating the evolution of the mental and moral faculties in lower animals. Animal behaviour is a study which at all times gives much pleasure and amusement; but its supreme importance and interest is found in the fact that it places in our hands the master-key which unlocks the secrets regarding the Evolution of Human Morality.

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THE PASSING OF THE PHANTOMS

CHAPTER I

THE REALITY OF EVOLUTION

The widening of the horizon of biological knowledge within recent years has been remarkable and has cast a flood of light on the question of 'Man's Place in Nature.' At the present day well-informed persons have abandoned the idea of a 'miraculous' or special creation of man, yet it is curious to note with what tenacity tradition adheres, and how speculative theories and poetical imaginations to a large extent still prejudice the mind to shut out pure reasoning and rational philosophical thinking. While it has become very general now-a-days to accept the idea of evolution as that method by which man came to inhabit this planet, one still asks do most of us thoroughly grasp the

principles of the doctrine which we profess to accept? While many of us do, still it would appear that there are others who vaguely accept the doctrine because it is becoming more fashionable to do so every day. That is to say man, a highly gregarious animal, is carried away to follow the strong leaders of the flock. But to get a clear conception of the wonders of organic descent one must insist that it is not enough to listen only to lectures: we must be students of Nature, endowed with a wholesome amount of scepticism, and not content ourselves with accepting *en masse* the evidence of others without verifying for ourselves as far as we can the revelations made in the study of the biological sciences.

Evolution a reality

I introduce these few sentences at the outset because I wish to point out what a very strong attitude of mind in favour of the reality of human evolution is fostered by those of us who have had the opportunities of making a special study of biology, more

particularly when this includes a detailed knowledge of human anatomy and embryology But it might be asked Why then do our medical brethren who study anatomy in detail not act more fervently as propagandists of the theme of evolution ? As a matter of fact, I have seldom met with a medical student who at the end of his anatomical course has not, at least in an unprejudiced and general way, accepted evolutionary principles , but, even if such fail to occupy a foremost place in his mind, it is not surprising considering the strongly utilitarian view he takes of the study in question. The medical student, and he who teaches the subject of anatomy from this utilitarian standpoint alone, obtain but a limited view of the great principles of human structure. This is brought home to us at once by taking one or two familiar examples The medical student seldom stops to consider the significance of the presence of the mammary gland in the male. To him its presence is probably a

matter of little import. But in the mind of the anatomist the question at once arises Why is the organ there at all, if it be useless? And he finds by further examination in an early stage of the intra-uterine development of the individual that the gland is already present when the external sex-organs are indistinguishable, and when it would be impossible to say which sex the individual would ultimately assume. The logical conclusion arrived at, then, is that this gland is only suppressed, in one sex, so that the male has incorporated in its body structural features, more fully developed and functional in the female, a distinction merely of degree but not of kind. *Vice versa*, an examination of the female generative organs reveals to us the fact that the male homologues have not vanished, but are merely suppressed. This short chain of reasoning from objective biological evidence regarding the presence of structures which can

Evidence of Evolution from vestigial Sex-organs

be examined without even resorting to dissection has a most important bearing on the whole question of the evolution of sex from an ancestral hermaphrodite stock. And, indeed, we find on comparing our human embryo in certain very early stages with some lower forms of life which are hermaphrodite, that a marked similarity can be made out The evolutionary history of the mammary glands is highly interesting, and deserves short notice as shedding light on the reality of evolution. Sir Arthur Keith in his delightful work *Human Embryology and Morphology*(4th ed , 1921) says that "it is a remarkable fact that although the milk glands do not come into use until adult life, and although they must be regarded as among the later evolved structures of vertebrate animals, yet they are *the first of all the glands arising from the epidermis to appear during development of the embryo.* In the human embryo of the 6th week, or in the corresponding stage of a pig or of any other mammal, the primary mammary ridge or milk

line—a mere surface thickening of the ectoderm—is seen extending along the body wall on either side from axilla to groin. Breslau[1] regards these primary ridges as representatives of the brooding organs of the ancestors of mammals, from which structures he supposed that the mammary glands were evolved. In a large number of human beings (15%) one or more supernumerary nipples are to be found between the axilla and the groin, indicating the wide distribution of ancestral glands. The mammary ridge appears in both sexes alike, but this may not mean that both sexes of ancestral mammals were concerned in brooding or gave milk. The male is the father of girls as well as of boys, it is therefore necessary to provide both father and mother with a complete sexual outfit if each sex is to provide equal shares to the making of their progeny. In females the breasts undergo a great development at puberty while in males they retain their infantile

[1] *The Mammary Apparatus of the Mammalia*, with Introduction by Prof J. P. Hill, London, 1920

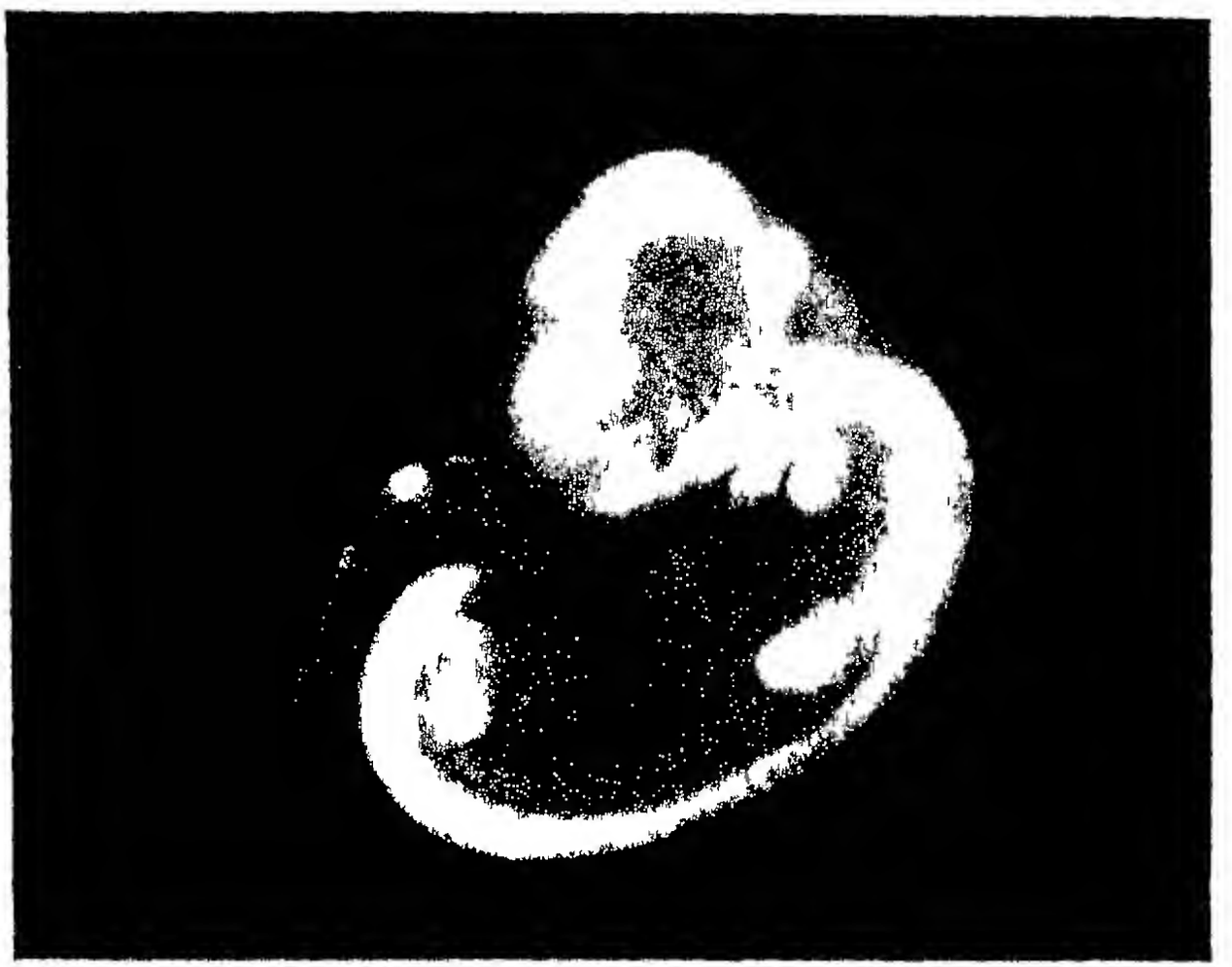

PLATE II *Photograph from nature by C. J. Patten*

An embryo of a Guinea-pig at a stage of development when the limbs are beginning to appear in the form of simple bud-like outgrowths. Mammalian embryos (Human included), are practically indistinguishable at a stage corresponding to this in development.

The embryo is magnified six times, its natural size being 8 mm., or a shade under ¼ inch.

[*face p. 12*

form" Many other instances could easily be cited of the presence of structures which afford us incontestible evidence of the evolution of the human body from ancestors not necessarily of human form Suffice it to draw attention to certain muscles which in *Herbivores* and other Orders are well developed and functional but are only vestigial in man, and to other muscles present in certain groups of lower animals, which, though long-since disappeared from the later human ancestry, nevertheless occasionally, by the strong strain of heredity, make their appearance again in human beings of the present day. The study of Human Embryology is most convincing, and carries with it incontrovertible proofs of evolution. We find that it is only at the later stages of development within the uterus that the human being is recognizable as such, when it is known as a foetus. In common with other higher animals,

Evidence of Evolution from atavistic myology

man *in utero* repeats the stages of his ancestral-tree from the very lowest to the highest forms of animal life, due allowance being made for a blurred and imperfect picture owing to adaptative modifications which have arisen during countless ages and are purely secondary in character Nor can it be argued that the process by which development proceeds is simply a mechanical one, built on a uniform plan or design of Nature For, if it were, to take a simple example out of hundreds, one might ask why, just at the termination of foetal life, the digits of the limb are so specialized in different mammals? All arise alike ; but compare the hoof of the horse, the flipper of the seal, the functionless and atrophied thumb of most quadrupeds, and so on, with the hand of man (*v Pl* II). There is no moulding within the uterus to produce these patterns mechanically We are led to consider that, while we inherit through our non-human ancestors many features

Evidences of Evolution from Human Ontogeny

(more or less portrayed in our living non-human cousins), we also have had impressed upon us, demonstrable only at the termination of our embryological career, the features of our immediate predecessors, namely our own parents, and these features hall-mark us as the individual proper to which we belong, that is to say into which we have evolved Even these few instances which I have cited regarding the study of human structure will, I think, suffice to remind us how intimately bound up become the thoughts of the anatomist with the evolution of his own body. Material for investigation is before him daily, and he cannot—even though he wished it—get away from the fact which may be expressed in Darwin's words . " Man still bears in his bodily frame the indelible stamp of his lowly origin." But here no thoughtful anatomist can stop With the material for the study of the development of the Brain in front of him, from the extremely simple membranous tubu-

Mental Evolution

lar condition of that organ to the adult form, when the scheme of its complexity seems an almost hopeless task to unravel, with the application of his knowledge of function supplementary to his knowledge of structure, he is carried onward ever more and more to consider as far as he can push his biological data, the physical basis of mental manifestations which go to form the phenomena grouped under habits, out of which the conduct or ethical aspect of the individual, relative to his fellow-creature, springs As the processes of mental development are very imperfectly realized, I may here indicate very briefly the outlines along which the Brain develops, pointing out at the same time its correlation during phases of its development with the permanent, that is, the adult condition of the brains in several other animals. The expression 'thin-skinned,' often applied to persons who might be judged as

Outline of the Evolution of the Human Brain

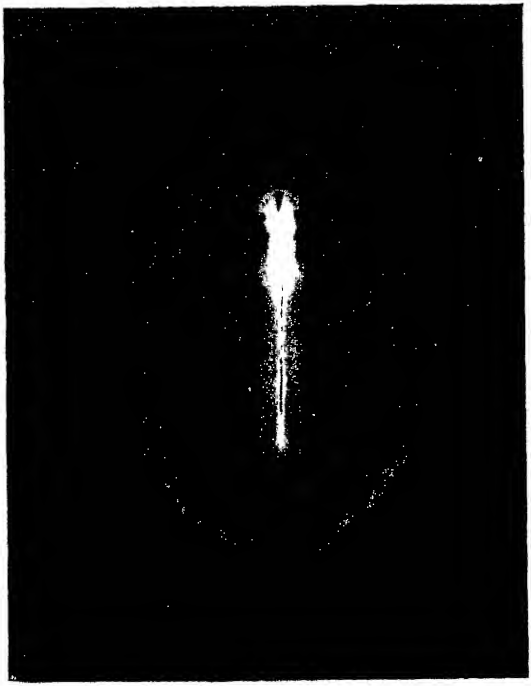

PLATE III *Photograph from nature by C. J. Patten*

An early embryo of a Song-Thrush on its embryonic shield, seen from the dorsal aspect, and showing the commencement of the nervous system in the form of a groove which dilates at the head-end to form the primitive brain

The embryo is magnified 7·6 times, the natural size being 5 mm., or ¼ inch

facc. p. 16

mentally over sensitive, is not inappropriate when we bear in mind that the Brain and Spinal cord, in fact the whole nervous system, originates from the skin-layer of the embryo, and, indeed, in the lower forms of Invertebrate animals the beginning of a nervous system is diffused over the skin-layer, in which are found indications of sensation. In such forms, for instance as the jelly-fishes, the brain-skin layer does not differentiate or split off into its two component parts, but in higher forms we find development proceeding in this wise, an elongated groove appears on the surface of a circumscribed area of an oval-shaped vesicle The area is known as the embryonic shield, because it is on it that the embryo is afterwards laid down But when the groove first appears there is, so to speak, but little else of an embryo, except that part which is now differentiating itself into the form of this groove. In other words, a very early indication of the appearance of the embryo is represented

Brain and Skin

by its groove-shaped nervous system. But to continue The surface-groove is soon converted into a simple straight tube, which, seeking a deeper situation, becomes surrounded by other tissue and cut off from the general surface-layer. Its wall then is extremely thin, comparable to a very fine membranous film, and the cellular elements of which it is composed are comparatively simple in shape, such as are found in many other parts of the permanent body Very rapidly, however, the front portion of the tube dilates into three bulbs which are separated only by surface constrictions, so that their spacious cavities are continuous. These bulbs or vesicles are, in fact, the whole of the primitive Human Brain, out of which all other subdivisions of the organ are derived (*Vide Plate III*). Microscopical examination reveals to us here, and also in the lower portion of the tube (the latter forming the spinal cord), very thin membranous walls. How-

Vesicular stage of the Human Brain

ever, with high magnifications of the microscope, the cellular elements are seen to be evolving speedily from simple to more complicated shapes. They give out branching processes which minutely interlace with those of neighbouring cells. These cells become very complicated in the ultimate analysis of their minute protoplasmic structure before the wall of the brain undergoes much thickening They serve the purposes of allowing stimuli to pass from one cell to another, which, shooting along the innumerable branchings, can set up changes in the cellular elements, sometimes over a considerable area of the Brain. However, as long as the wall remains thin the cell-machinery remains, comparatively speaking, very limited in its action. In the lower forms of fishes, whose brains developmentally correspond more or less with the conditions of the early Human Brain, the higher mental manifestations, such as *memory, thought,* and so on, are feebly, if at all, capable of being called forth. If we now

examine the fore-brain of a Human Foetus somewhat advanced, say at the stage when the organ is structurally comparable to the brain of an adult rabbit, we find that the walls have greatly thickened, giving the organ the appearance of being solid with a small hollow core. A very thin section of this wall shows vast numbers of complicated branching cells—what myriads, therefore, can the entire thickness of the wall accommodate ! A step further and we behold in the Brain of the new-born babe a highly elaborate organ with immensely thickened walls stocked with cells which form the psychic machinery, and too intricate in their structure to call for special description here. And while now, from the structural point of view, we may regard the Human Brain as almost completed in its marvellous complexity, we are nevertheless struck with the great hiatus existing between the mental powers in parent and babe. It is true that many faculties of the Brain (which we would have as abstract in nature)

manifest themselves at an extraordinarily early period, and that they seem to be the results of past experiences of the Human Race, which, having accrued, have been passed on by heredity to the offspring, yet others, and even the same faculties under different conditions, are put into action by experiences founded mainly on the child's own observations and experiments. Regarding experiences inherited, Herbert Spencer points out that "an infant in arms, when old enough to gaze at objects around with some vague recognition, smiles in response to the laughing face and soft caressing voice of its mother. Let there come someone who, with an angry face, speaks to it in harsh tones. The smile disappears, the features contract into an expression of pain, and, beginning to cry, it turns away its head, and makes such movements of escape as are possible. What is the meaning of

The Brain of the babe and the Evolution of Mental Faculties

these facts? Why does not the frown make it smile, and the mother's laugh make it weep? There is but one answer. Already in its developing brain there is coming into play the structure through which one cluster of visual and auditory impressions excites pleasurable feelings, and the structure through which another cluster of visual and auditory impressions excites painful feelings The infant knows no more about the relation existing between a ferocious expression of face, and the evils which may follow perception of it, than the young bird just out of its nest knows of the possible pain and death which may be inflicted by a man coming towards it, and as certainly, in the one case as in the other, the alarm felt is due to a partially established nervous structure. Why does this partially established nervous structure betray its presence thus early in the human being? Simply because in the past experiences of the human

Inherited Experiences of mental manifestations

race smiles and gentle tones in those around have been the habitual accompaniments of pleasurable feelings, while pains of many kinds, immediate and more or less remote, have been continually associated with the impressions received from knit brows, and set teeth, and grating voice Much deeper down than the history of the human race must we go to find the beginnings of these connections The appearances and sounds which excite in the infant a vague dread indicate danger, and do so because they are the physiological accompaniments of destructive action, some of them common to man and inferior mammals, and consequently understood by inferior mammals as every puppy shows us. What we call the natural language of anger is due to a partial contraction of those muscles which actual combat would call into play, and all marks of irritation down to that passing shade over the brow which accompanies slight annoyance are incipient stages of these same contractions. Conversely

with the natural language of pleasure, and of that state of mind which we call amicable feeling, this too, has a physiological interpretation" Let us now examine the same faculties, viz *sorrow* and *joy* under different conditions, and see how the Brain machinery is called forth into action. The child trips over the door-mat and falls in its eagerness to reach the sweetmeat held up in the parent's hand at the other end of the room The fall occasions pain, but only in a slight degree, not sufficient to warrant the burst of screams and sobs which follow. The experiment is repeated, and the child comes down again, this time more easily still, but the cries become worse and more prolonged. And, if the experiment is again repeated and the child falls, its sorrow instead of abating seems to increase. Why is this? It seems contrary to the more familiar cases of children who, after several upsets of an easy kind, i.e. involving

Physiological interpretation of Anger and Pleasure

little or no pain, become used to the mishap and get up smiling But the particular child of whom we speak has made an important observation as it treads its way hastily across the floor, and as it falls it continues in piteous sobs, to observe—what? *the sweetmeat* And it is in the great disappointment involved in the loss of time in securing the coveted tit-bit, coupled with sensation of pain, here only slightly felt but no doubt involving an unpleasant inherited sensation, that such an outburst of the mental manifestation—*Sorrow*—is now unfolded In a short time the child tries the experiment of raising his feet higher in passing over the door-mat, and now, finding that in so doing he no longer comes tumbling down and consequently can scamper across the room without interruption to obtain the sweet, the mental manifestation of—*Joy* is more and more unfolded and the outbursts of laughter, as the experiment

The unfolding of the mental Faculties of Sorrow and Joy

is repeated, become more marked And further, regarding this part of the subject, it may be said that while there is reason to believe that the basis of Memory is to a large extent the outcome of inherited experiences, still it undergoes rapid expansion as the child proceeds to build up its own vocabulary by associating sounds with ideas, and by showing a most earnest desire to reproduce those sounds as seen in the impatient and imperfect way in which they are blurted out, the parent often being at a loss to know what they mean.

I need dwell no further on the support of the truths of Evolution it is clear that physically and mentally we undergo a gradual process of development from the simple to the complex organism. The evidences to be derived from the living forms of animal life around us need not here detain us Let us just bear in mind that none of those now living could closely represent in form our ancestors, as it is sometimes stated. Their kinship could only be

Phylogeny or Stem-Evolution

that of a cousin the ape a closer cousin than the cat, the cat a closer cousin than the jelly-fish These creatures are in themselves modified from the common ancestral stocks (vast numbers of which have long since become extinct), from which their cousinship has diverged A study of ancestral stocks would take us too far a-field in this treatise, so we must be content to accept the statement that pre-natal evolution or the evolution of one's own being, and stem-evolution or evolution of the race are closely intertwined But since I have asked you to give your support to Organic evolution, largely on the evidences derived from a study of pre-natal development, one question will probably suggest itself, namely, what is the nature of this extraordinary persistent force of heredity which acts on the egg of a Human Being, which Human Being has for thousands of years lost to a great extent his resemblance to unhuman-like ancestors.

Cousinship with all living beings

The early stages of pre-natal development, were these mechanical in nature, would be more easily understood, because the embryos of many animals are then almost indistinguishable, and might, so to speak, be cast in the same form of mould But, with regard to the later stages, where the mechanical notion is quite impossible to entertain, we ask how does heredity act in evolving a generalized fore-limbed-embryo into the special form of its parent ? It is true that aberrant types do arise, but these are so exceedingly rare[1] that their occurrence does not seem to affect the question We ask if an embryo, say of a dog, is during its stages of development recapitulating its genealogical tree, why is it not sometimes born unlike a dog, and like some more or less remote vertebrate

[1] Such must be distinguished from the *monsters* of medical science, which include many forms of arrest of development, and plural fusions One genuine aberrant form of kitten has come under my notice, in which the face was long and pointed and the eyes open at birth

ancestor? For, after all, when due reflection is made with regard to the wonderful transformations in later embryonic existence which go on, it is remarkable with what surety the offspring reaches the goal and structurally is born an exact miniature of its parents This marvellous hereditary conservation which permits of *like begetting like* seems to depend upon *long-associated habits of the cellular elements of the embryo itself.* This is made more clear when we remember that, as Sir Francis Darwin has put it,[1] the characteristic of habit is, *par excellence,* a capacity acquired by repetition of reacting to a fraction of the original environment. Thus, when a series of actions are compelled to follow each other by applying a series of stimuli, the actions become organically tied together, or associated, and follow each other automatically even when the

The Force of Heredity in Ontogeny

[1] *Presidential Address.* Brit. Assoc. Dublin, 1908

whole series of stimuli are not acting. And further light is thrown on the subject when we take into consideration the fact that stimuli (here represented by a series of stages of cell-division and growth, each stage apparently serving as a stimulus to the next) are not momentary in effect,but leave a trace of themselves on the organism constituting thereby the physical basis of the phenomena grouped under *memory* in its widest sense. Indeed, there is reason to believe that *memory* has its place in the morphological or structural as well as in the temporary reactions of living things. And finally, with regard to the memory-faculty in connection with the development of the Human Embryo from its initial stage as a simple egg into the perfect organism, in referring to the wonderful series of ancestor-like changes which take place and which resemble those that arose in the long process of stem-evolution, here Sir Francis Darwin draws a striking analogy in saying:

Physical basis of Memory

"This is precisely paralleled by our own experience of memory, for it often happens that we cannot reproduce the last-learned verse of the poem without repeating the earlier part each verse is suggested by the previous one and acts as a stimulus for the next The blurred and imperfect character of the ontogenetic version of the phylogenetic series may at least remind us of the tendency to abbreviate by omission what we have learnt by heart" It is a matter of profound interest to know that the basis of *memory* by association exists in very low forms of animal as well as in plant organisms. In the latter this factor has been illustrated by the power of movement, which power, though acting to stimuli, can be seen to take place in the absence of such That a simple form of associated action implies consciousness, as we understand that phenomenon, is a point I am unable to enter upon, and yet it is impossible to know whether

The Existence of Memory in plants

or not plants or the simplest forms of animal-life are conscious, "but it is consistent with the doctrine of continuity that in all living things there is something psychic, and, if we accept this point of view, we must believe that in plants there exists a faint copy of what we know as consciousness in ourselves" (Sir Francis Darwin).

Psychic element pervades organic Nature

CHAPTER II

EVIDENCES OF THE EVOLUTION OF MENTAL POWERS

From what has been said in the foregoing pages it is evident that not only our bodily equipment but also our mental manifestations—which latter are often regarded as abstract, and merely concomitant with changes in the brain-substance rather than physically the direct outcome of such changes—these have a deeply rooted origin in the remote beginnings of living things Space has permitted me to approach the faculty called *memory* only from the developmental standpoint I have selected it because, while we have evidence to show that *memory* is not confined necessarily to the workings of the Brain alone (the other cells of the '*soma*' or body, participating in the manifestations of this phenomenon), and therefore while its supposed purely mental origin in embryonic existence may be considered as incomplete, never-

theless the conscious mental workings of this marvellous faculty after birth are of primary importance in connection with the rise and advancement of morality Subservient, and revolving, so to speak, around Memory, as the planets round a solar system, are such emotions as *Joy, Sorrow, Fear, Anger, Love,* etc, and some of these we have already touched upon from the developmental point of view Other expressions of mental activity of great importance and complexity, such as *Curiosity, Imitation, Imagination, Admiration,* etc. have also evolved, and their presence can be traced far down the trunk of the ancestral tree. But the evidence of their evolution must for the most part be assumed, for even a comparison of these faculties with the same in man is a subject which I cannot here touch upon, except in some of the cases which have come under my personal notice. If the reader wishes to pursue this subject further let him glean from the

Psycho-biological analysis of mental faculties

pages of Darwin's *Descent of Man*, and he will see, in the chapter on this theme, an array of marshalled facts which leaves no room for doubt

I will confine my attention to observations which I have made on the powers of *Imitation*, *Attention*, *Imagination*, and *Admiration* among some of the lower animals My subjects have been pigeons, hawks, dogs, cats, and horses, all of which except the last were at one time or another my own particular pets. And I would add that in each case the particular faculty in question has been strongly developed during the animal's tenure of captivity. I shall also recount a few more cursory observations on animals in Zoological Gardens. I have always had a particular fancy for hawks. Attracted by their beauty of form, bold, fearless, and honest expression of eye, their hardiness of nature together with the rough and ready way in which, when one has gained their confidence and love, they will exhibit affection,

Hawks · faculty of Attention

are points to which I have paid much attention I have kept a succession of hawks ever since my boyhood, and have noticed on many occasions remarkable instances of the development of a faculty which should be capable of expansion in them, namely *Attention* This I say because the brain of a hawk may be well described as an *eye-brain*, the sense of sight being developed altogether out of proportion to the other senses One of my Kestrels, which was a female, would attend so eagerly to a sudden rush and bark of a little dog when near the cage that I could lift up one foot, gently close the bird's talons, and shake 'hands' The reason of this concentrated attention was that the hawk associated the sudden barking with the presence or possible approach of a black cat which periodically came round and tried to purloin the meat, an action usually checked in the nick of time by the canine custodian The bird loved music, a soothing lullaby, constantly repeated, would call forth so marked

contentment (as the bird gazed with steadfast look into one's face)that one could stroke her feathers, a proceeding much objected to under ordinary mental conditions A friend staying on a visit, who has a passionate love for animals, took a great fancy to my pet, and this was strongly reciprocated. One evening as the bird stood on a table, she lent over her and in whispering tones commenced a soft lullaby So charmed, I might say almost mesmerized, became the listener that she took no notice of a miniature doctor's gown, of bright red and blue material being laid across her shoulders ; and it was not for several minutes afterwards, when she awoke from her reverie at the cessation of the music, that she beheld her strange guise, and then with a swift stroke of her claws pulled off the garb. This hawk was strongly imaginative, as the following incident will illustrate. On approaching her coop with a hard black felt hat on my head,

Hawks. faculty of Imagination

she never recognized me, and exhibited considerable dread of my presence I cannot say that I have quite discovered the reason, but it would appear that she conjured up in her mind a vague mental picture of something animate or otherwise which she had probably once upon a time seen and which frightened her, and that she associated its form with my harmless head-gear. The timidity can hardly be the outcome of inherited experience, for no natural enemy that I know bears a semblance to the rim of my hat, which I think is the part she feared most. Rooks and especially ravens often mob and drive away from the cliff this species of Hawk, but I fear it would be far-fetched for me to entertain the notion that my hat appeared as an effigy of one of these swarthy combatants, especially as my bird never saw either cliff or raven in its life. Indeed the *colour* of my hat was not the real cause of alarm, as is seen by the fact that a person

Fear associated with Imagination

dressed entirely in black without the hat on, approaching instilled no fear And so, as an ultimate suggestion, I ask, *was the colour coupled with the form, of my hat* conceived as resembling the feline lurker above referred to ?—and, if we admit this, we must allow for considerable elasticity of the bird's imaginative faculty. At all events, whatever, was her cause of fear, it seemed unwarranted, for I have never tried to induce fright—in fact, when wearing the hat, I have sought to distract attention by the offer of food , but this has been of no avail

Pigeons faculty of Attention

Most of us are aware that in pigeons both sexes take on the task of incubation. But sometimes the female will leave her eggs for a short period in order to obtain food, when she will return for another spell on the nest before exchanging duties with her mate. When she is on the ground, the male usually feeds for a short time with her , but, if she delays too long, he hunts her back to

the nest Among my own pigeons I have observed how a female which remained off her eggs too long, after several offences drew the attention of her mate so markedly that, on attempting to come off her eggs again he immediately flew after her and, pecking at her vigorously, succeeded in sending her back at once to her maternal duties—in fact he showed distinctly that he did not intend to allow her to leave the nest until it was time for him to take on his share of incubation

Cat. faculty of imitating voice-sounds

Illustrative of the faculty of imitating voice-sounds I cite the following: In a large male tabby-cat which showed great aptitude for performing tricks I managed to develop a curious double call-note I incidentally noticed this strange sound, which the cat first made when he had a severe throat affection Unable to produce the usual prolonged *'mew'* when about to receive his saucer of milk, he endeav-

oured to show me his wants by two little ejaculations resembling the barks of a puppy During his illness he made these sounds at very frequent intervals of the day, and it occurred to me that, if I gave him milk each time he uttered them, he might associate this generosity on my part with the abnormal sounds he produced As the cough passed away, and the normal prolonged single-syllabled '*mew*' returned, I used to hesitate before putting the saucer to the ground At first there was no response, but soon the bitter disappointment which seemed to enter the feline mind at being refused its drink in response to many a plantive '*mew*' seemed to awaken in his memory recent associations of ideas suggestive of the repetition of the double note. The moment I heard this I placed the saucer of milk on the floor and thus after some difficulty I succeeded in developing a permanent double call-note in this domestic pet. Here it would appear that the cat learned to retain by imitation an abnormal sound

which emanated from himself originally, though I must have helped on the power of this faculty by my own mimicry of the abnormal sound which I often repeated when bribing the animal

Dogs faculty of Imagination

Imagination is highly developed in Dogs. Their intellect is so bright and their disposition so sympathetic that it is an easy matter to beguile them into the belief that harmless inanimate objects may possess 'evil spirits.' One of my small dogs always stole away from me with uncoiled lowered tail if I showed her a black bottle, and this dread of the uncanny is simply due to the fact that the first time I showed the bottle I uttered a few remarks in a grave tone similar to that which I would adopt if she put her muddy paws on my coat or committed a like trivial offence. This fear is hardly comparable to that displayed when a dog is shown the whip, for in the latter case the animal has probably been on many previous occasions severely hurt by the actual

use of the lash If a few gravely uttered sentences once made were sufficient to deter the animal from approaching a certain object, why did the same animal jump on my lap repeatedly with muddy paws when the bottle was not visible? In the latter action correction had been more repeatedly and stringently enforced—indeed I have often shown annoyance, as one naturally would, at one's new clothes being smeared with mud The answer to the question seems obvious The dog had acquired a permanent love for her master she longed for petting and caresses When she saw him sitting on a chair, she, on entering the room, bounded on his lap, forgetful in her excitement of previous corrections. But a black bottle was an object concerning which she was absolutely indifferent to originally, and would have passed it by in the street without further ado When, therefore, she saw her master (whom she was wont to revere with almost complete religious-like submission) introducing her in

grave warning tones to this curious object, her imagination began to expand, and her original indifference, passing through phases of suspicion or curiosity, became lengthened out into a *permanent superstition*

Dogs belief in Spirits

Several dogs that I have kept have indulged in the habit of uttering a melancholy whine during moon-light I used to think that the light shed from the moon itself was the direct cause of such utterances, but it has been pointed out that, as dogs stare not at the moon but at some fixed point on the horizon, their "imaginations may be disturbed by the vague outlines of the surrounding objects, and conjure up before them fantastic images if this be so, their feelings may almost be called superstitions." Returning to observations made on a pug-dog, I may add that she was fully sensible of *Admiration;* by decking her out with a bright blue or scarlet ribbon tied in a big bow round her neck, by praising her with

pleasing tones and friendly pats (especially in the presence of a circle of human admirers), she would sit up and start a sort of chattering conversation, often in little ejaculations of two or three syllables, then pause, and then start the same again, this being kept up for some time. Increase of conversation, especially when addressed to the animal, would encourage this action, which was accompanied with the fullest amount of facial expression possible—indeed a faint incipient smile appeared as the upper lip was softly raised and retracted. This expression was quite distinct from the raised lip seen during a snarl, for, in the latter case, the other facial muscles of combat were brought into action This chattering sound to which I have just referred had evolved from a few short sharp barks impatiently emitted when I neglected to throw bits of biscuit after asking the dog to "beg" And instead of always throwing the bits at once,

Dogs faculty of Admiration

and thereby stopping the barks, I used to address the dog in somewhat similar tones to its own, but I added to the syllables by repeating this on many occasions when giving food, I managed to call forth response Ultimately I could set the chattering going by warm adulation alone.

Dogs faculty of Mimicry

While dogs are highly imaginative, I do not think they possess much faculty for mimicry, yet there are some remarkable instances, cited by observers of repute, illustrating to what a remarkable degree this can be brought out The instance which I have given regarding the chattering, and which has been developed partially along the lines of mimicry, is all I can recount in the case of dogs But, curiously enough, many instances are cited of dogs (which have been reared by cats) licking their own paws and then rubbing their faces and ears (such a well-known action of the cat) I had a cocker spaniel which indulged in this habit quite frequently,

though not exclusively, and yet his only intercourse with cats has been to chase them off the premises

Horses belief in Spirits

Returning to the question of the faculty of *Imagination* culminating in an elemental superstition in lower animals, I will just refer to one of many cases which I have witnessed in Horses A horse, yoked to a light trap containing two occupants besides myself, was being driven down an avenue. Peeping over a hedgerow of an adjacent garden was a large sun-flower, which the animal observed some little distance off. Drawing near, he watched it so steadily that several pulls of the reins failed to turn his head Arriving opposite the inflorescence, he stopped momentarily, and, not in a fearful but rather in an intensely curious way, stared at it. A slight breeze caused the plant to sway forward, whereupon the animal commenced to bolt. The curiosity here aroused, which ended in the animal's short halt to investigate this

strange object, seems to me to indicate some dim idea in the animal's mind of the presence of something uncanny.

Horses genuine fright at natural enemies

The animal evidently regarded the sun-flower as a fetish. I am lead to believe this inasmuch as such action differs markedly from the immediate stampede which even a well-trained, quiet, and fully-grown horse will make at its natural and real enemy, a lion or a tiger, should even only the head of one of these beasts appear afar off.

In regard to the faculty of Imagination occurring in wild beasts confined behind prison bars, it is quite amazing to observe what may or may not present itself as a fetish I placed a reflex camera with a *large telephoto lens* close to a cage tenanted by a lion and a lioness The camera was slung from my shoulders I had hardly commenced to manipulate the instrument when the animals, becoming conscious of the uncanny stare of a cyclopean monster (lens), instantly

stampeded, performing a series of catherine-wheel actions round their den In an adjacent cage was a panther. On seeing "cyclops," this feline retreated to a corner and commenced to growl and hiss, changing corners as I moved diagonally in front of the bars. Reflex cameras now-a-days are used so extensively in zoological gardens and menageries that the animals, unless freshly imported, take little notice of them, however it was not my camera alone which brought such consternation to the king of beasts and his queen, it was the *unusually large lense* ("the eye of cyclops") no doubt very seldom seen in a Zoo—which shocked them. The uncanny may be something very small On one occasion I saw a puma very much frightened at the sight of a white mouse sitting on the back of a man's hand placed close to the cage; a similar case has been recorded of a tiger being terrified when a mouse, tied by a stick, was inserted into its cage, the great beast, crouching in a corner, trembled and roared in a paroxysm of

fear We are superstitious of tiny creatures of human form (Fairies). Perhaps the tiger entertained a similar mental state of a fairy quadruped !

Having related these instances, and before leaving the question regarding the mental powers as exhibited in the animal kingdom I will remark that the tendency to imagine Spiritual Essences in natural objects evidently has had its origin in creatures below the human race, a point of much importance in pursuing one's inquiries into the origin and value of the ethical code in relation to primitive and more advanced theologies, and into the real value which we must endeavour to attach to so-called right and wrong. When Charles Darwin's dog, which he describes as a full-grown and very sensible animal, growled fiercely and barked at the open parasol on the lawn which the wind slightly moved, having no knowledge of the cause, a dim ethical aspect of the matter took possession of the animal's mind was it right or wrong to permit such a strange ' living ' agent

to cause this movement? In his ignorance, the dog condemned this cause of action, but ethically he was wrong in so doing, for he gained nothing, nay rather expended unnecessary energy in barking at the effects of the wind, and, for aught we know, this uncalled-for expression of his feelings may have disturbed the balance of nature's equilibrium among the creatures which lay around him. I cite this example because we see on a far larger scale so many parallels of boisterous expressions poured forth not only by ignorant savages but by civilized, nevertheless superstitious, people, in their endeavours to solve the problems of supposed Right and Wrong, the effects of which they witness but of the causes of which they know nothing, and about which they often frame the wildest and most fantastic conjectures.

Ethics of effects in the ignorance of the causes

CHAPTER III

EVIDENCES OF THE EVOLUTION OF THE MORAL SENSE

One might first be inclined to think that the upgrowth of the moral sense would develop alongside the upgrowth of the mental powers—I mean that the more complicated structurally the Brain became the more elaborated and complex would become codes of ethics. But in the long stem-history of Biological Genealogies we see in many of the side-eddies which are carried from the main stream of evolution evidences not only of arrested progress but of decided degeneration, and so the growth of morality does not go on in all cases *pari passu* as the antiquity of the organic evolutionary factor is prolonged. In Ants, Bees, and Wasps, for instance, one sees the ethical

Arrest of progress in Evolution

side of life brought into far greater evidence than in many of the vertebrate animals. The lines of conduct of these insects are directed along many and diversified paths, but herein lies such an extensive study that I must only make a passing reference to the subject. Lord Avebury has said

Habits of Ants

"The Anthropoid apes no doubt approach nearer to man in bodily structure than do any other animals, but when we consider the habits of Ants, their social organization, their large communities, and elaborate habitations; their roadways, their possession of domestic animals, and even in some cases of slaves, it must be admitted that they have a fair claim to rank next to man in the scale of intelligence." Ants as a class adopt an extraordinarily active and a varied mode of existence, and while their industry is not surpassed by that of Bees and Wasps, which work all day and in warm weather often at night, trustworthy observers tell us that Ants

Ants' times of relaxation from work

indulge in amusements or "sportive exercises," and will raise "themselves on their hind-legs and caress one another with their antennae, or engage in mock warfare, etc." A striking habit is that of licking one another to assist in cleaning. It has also been stated that if Ants are only slightly hurt or are unwell their companions will tend to their wants; though, when badly injured or very ill, they are removed from the nest and left to die. Ants then, speaking generally, possess attachment and affection for their fellows, and moreover there are individual differences between them as between men. These insects are in deadly earnest when engaged in warfare; their military tactics are wonderfully organized, their army possessing soldiers, scouts, drivers, and so on. The natural history of such delightfully interesting creatures deserves special attention, and no doubt there is ample room still for observers to add to our present store of know-

ledge regarding them But space does not permit me, moreover I hardly wish, to emphasize the mental powers of these insects, which, though very apparent, may be, for the most part, if not *in toto*, the results of inherited experiences and performed from the beginning of their *imago* existence almost in an automatic manner However, the few instances regarding their habits which I have set forth undoubtedly stamp these creatures as possessed of a remarkable moral sense, but whether self-consciousness, as we know it, of their sense of morality exists is quite another, and I fear an unanswerable, question. Among certain vertebrate animals the moral faculty is well developed in many directions, and the number of instances illustrating mutual aid, succour in distress, and concerted action in battle, that have been given, appear to broad-minded persons as examples of elevated ethical standards of conduct. As in

Ants: moral sense

the case of the mental powers displayed by lower animals, I shall here confine my remarks regarding the faculty of the moral sense to those examples which have come under my personal notice · such cases are not necessarily confined to animals in a state of captivity

Moral sense in Gulls and Terns

One cannot but admire the marked attention which a flock of Gulls or Terns, exhibits when one of their number has been winged and lies struggling on the water. The gunner, should he remain close by, is ignored, and therefore other members of the flock within gun-shot range run the risk of losing their lives. That the attentiveness of the flock carries with it tenderness of feeling, an anxious curiosity, a wish to do something to get the fallen comrade

Attitude towards the wounded

either on the wing again or out of sight of the danger zone, is shown in the way the members fly gently to and fro, every now and again sweeping to the water as though

encouraging the cripple to try to rise, while others higher up scream loudly for succour as they steady themselves on hovering wings Those of us whose eyes are trained to the different forms of flight in the same species would unhesitatingly say that here in their movements the birds were fully sympathizing with the unfortunate position of their fallen companion. As we gaze for a little time on the scene of action, we are led to ask the question What more can these birds do ? Unable to convey the wounded to a place of safety, they linger on, and by their presence appear to comfort their companion in distress Such an ethical aspect is in itself worthy of note, but the case is of more than usual interest because, in their endeavours to bring happiness not only to their flock but to their wounded individual

An example of Nature's far-reaching code of ethics

these sympathetic birds unconsciously become the means of establishing a second and more far-seeing ethical code. For Nature,

whose inexorable law of the Struggle for Existence formulates that we live for the general good rather than for the general happiness, here shows the destiny of the wounded bird as it is mercifully hurried to its doom, more quickly than had its comrades abandoned it at once For the screams of the Terns have attracted a large predatory bird on the scene Nature has thus conferred a double benefit she has put out of pain a poor fluttering cripple, which, had it lived, could have been of no use to the community, and in her economical manner has fed at the same time one of her predatory creatures.

Birds as sentry-guards

The services which birds of a given order render to one another when feeding in company are well-known to all observant ornithologists. Let me here refer to what I have seen in the case of Geese. One, two, or three, or even more act as sentinels, taking up their position at the edge of the flock The sentinels eat

but little, being constantly on the look-out until relieved of their duties by some other members Many other cases of out-posted sentinels in flocks of ducks, curlews, and rooks have come under my personal observation.

Often and often have I observed the still more remarkable and praiseworthy methods of mutual aid afforded by *many birds* of *many diversified species* gathered together in a vicinity (which may cover a very large area) against the common enemy Let the hawk appear in swooping flight with destructive purport (and very cognisant indeed are the small birds of this movement); let the cat prowl and crouch along the hedgerow or dare to come out on the open with the glare of hunger in its flashing orbs, then the air becomes filled with the loud, ringing, defiant battle-cries and alarm-notes of blackbirds, thrushes, finches, buntings, warblers, and others, each and all of which will boldly mount on wing to assail the feathered brigand, or will

fearlessly dash down, mob, and so harass the prowling feline that cover is gladly sought without further delay

Passing over the well-known moral sense of mutual aid rendered by mammals when danger threatens, such as the stamping of the hind-foot of the rabbit, and of the fore-foot of the sheep, I may conclude this chapter by referring to some points illustrating the ethical sense in fierce predatory animals. The Grey (or Hooded) Crow robs eggs, steals nestlings, and attacks and pulls to pieces disabled creatures often much larger than itself. And yet (as I have seen and elsewhere described) a slender defenceless Redshank may forage amid the seaweed alongside his powerful companion without the least fear of being attacked It is true that the Crow confines his attacks to nestlings and cripples albeit, considering the Crow's strength and opportunities of attack, it is remarkable with what amicableness the two species forage together to

Ethical code of fierce predatory animals

satisfy a common want. No doubt the Crow's power of refraining from attacking unwounded adult birds has become a deeply-rooted instinct, and that the Redshank knows by an equally deeply rooted instinct that it is safe in the company of the former, but this lesson we learn, namely that non-combatant creatures are not living in a constant dread of those which periodically make ferocious and determined attacks. This point I shall now endeavour to bring out much more clearly in dealing with purely flesh-eating animals. Many persons are in the habit of branding predatory animals with such undeserved characters as, '*savage beasts*,' '*treacherous brutes*,' and so on. This might lead one to think that multifarious species of defenceless creatures live in a constant dread of being seized every time a Hawk, a Cat, or some other animal of prey made its appearance. Far from this being the case, there are several hours of the day in which little birds combine into a flock, and enjoy mobbing the Hawk as the

PLATE IV *Photograph by C J Patten*

The Falcon's Kiss

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